VOL. III, Part II.

~~31st December, 1928.~~
15th January, 1929.

THE PROCEEDINGS OF THE ENTOMOLOGICAL SOCIETY OF LONDON

LONDON:
PUBLISHED BY THE SOCIETY AND
SOLD AT ITS ROOMS, 41, QUEEN'S GATE, S.W. 7

[*Price 4s. 0d.*]

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either at Belfast during the 1902 meeting of the British Association, or on the excursion to New Grange, Drogheda, and the site of the Battle of the Boyne, during the meeting, or, most probably, on the terminal excursion along the Antrim Coast Road as far as the Giant's Causeway. The specimen was probably taken in or near one of the hotels visited on this expedition. The earliest British capture hitherto recorded was that of A. E. Wright, who took the species at Grange-over-Sands, Lancashire, in August 1917, and again in the three following years. (See W. Mansbridge in *Entomologist*, 1922, p. 145.) In an accompanying note, the late Mr. J. H. Durrant, who had determined the species, stated that the genus was new to the British list (*ibid.*, p. 147). This Tineid, only known previously from Madeira, was originally described by Lord Walsingham in *Trans. Ent. Soc. Lond.*, 1894, pp. 550–1.

SOME METHODS OF COLLECTING LEPIDOPTERA BY DR. V. G. L. VAN SOMEREN.—Prof. POULTON said that he had also received from Dr. van Someren an account of two methods which would probably be useful to naturalists :—

" 16 *February*, 1928.—My brother sent me your letter on damp mud. [See *Proc. Ent. Soc. Lond.*, vol. ii, 1927, pp. 88, 89]. This is very common in Uganda and is a wonderful sight. On more than one occasion, when we have wanted one or two specimens from such a crowd, and have not wished to disturb and possibly damage them by enclosing a cloud of fluttering butterflies, we have placed the net carefully over the spot, holding the end well above the insects, and then sprayed chloroform over them. This has immediately anaesthetised most if not all the butterflies, and lifting the net, we have taken what we wanted and allowed the remainder to recover and fly off !

" I have recently hit on a simple method of collecting larvae from trees which I know to be the food-plants of Lepidoptera. My plan is to screw up lightly ordinary newspaper and tie it round the trunk of the trees. Every two or three days the paper is taken off and opened, and inside one finds larvae and pupae of many kinds of Lepidoptera, such as Lycaenids, Sphingids, Noctuids, etc."

NOTES BEARING ON UNISEXUALITY IN INSECTS BY DR. J. W. MUNRO, D.Sc.—[Prof. POULTON, in the unavoidable absence of the author, communicated his paper, and pointed out that it bore very directly on the enquiry into the methods by which the dangers of inbreeding are reduced.]

1. *Unisexuality in a Braconid.*—During a study of the biology of a Braconid parasite of the weevil *Hylobius abietis*, L., made during 1913–1914, I was puzzled at times to find that both in my field and laboratory work batches of *Bracon* cocoons from individual weevil larvae yielded imagines of only one sex, now male, now female. At first I thought that male broods were the result of unfertilised females, but in all cases pairing had been observed in the laboratory insects, and although I did not dissect females for spermatozoa I have no reason to suppose that pairing was not effective and normal.

So far I have failed to get the specific name of this *Bracon* determined. In the summer of 1914 I sent males and females to Prof. Szeplegeti in Buda-Pest, but the war probably prevented their reaching him. In 1919 I collected weevil larvae bearing *Bracon* larvae on them and reared the parasites, but obtained only males, and Dr. Waterston, who kindly examined them, informed me that in the absence of female specimens he could not determine them further than to say that they belonged to the genus *Bracon* and were near to *Bracon hylobii*, Ratz.

2. *Delayed mating in Calliphora males.*—Last summer Mr. J. Carroll, one of our research students at the Imperial College, was engaged in work on *Calliphora erythrocephala*, Mg. He began his biological work with wild flies caught in balloon traps laid on the roof of the building. The female flies so caught laid eggs on offal provided for them, and in due course these eggs produced the first brood of flies. The females of that brood laid eggs, but all of these proved infertile. More wild flies were caught, and it was found that the males so caught paired with the females reared and fertile eggs were obtained. It was then observed that male *Calliphora* flies do not pair with females of the same brood, but wait for later emerging females. In other words, male *Calliphora* flies do not normally pair with their sisters. It is worthy of note that B. T. Lowne made this observation in his studies of the Blowfly.

3. *Delayed emergence in Sawflies.*—In September 1911, when going over some small breeding-boxes in which *Lophyrus pini*, L. (*Diprion simile*, Htg.) larvae had been fed, I found that out of a batch of cocoons several males had emerged. They were all dead. Many cocoons were still intact and two of them when opened were found to contain living resting larvae. The cages were put away and forgotten until July 1912, when it was found that one female had emerged from an intact cocoon. The remaining cocoons contained shrivelled larvae. This suggests that in *Lophyrus* the males may emerge some considerable time before the females of the same brood. Parthenogenesis is well known in *Lophyrus* and this may account for the unisexual nature of the emergences, but it is an unlikely inference, as the cocoons in question were bred from females which had associated with males in the breeding-cages.

4. *Preponderance of Females in Strophosomus weevils taken in Spring.* In the spring of 1925 I was interested in collecting *Strophosomus coryli*, F., which had been causing injury in a forest nursery. I beat these weevils in large numbers from a belt of young spruce trees in "Three Corner Piece Plantation" in Bagley Wood, which adjoins a small forest nursery. All these weevils proved to be females, and it was not until June that males were taken. A similar experience occurred the same year in my experimental plots in Hawkhill Inclosure, New Forest. Parthenogenesis is known in the *Otiorrhynchus* weevils, but not in *Strophosomus*, and these experiences suggest a preponderance of female broods in those of the late summer which over-winter and appear again in spring.

The following papers were read:—

1. "A Permian fossil Damselfly from the Falkland Islands," by Dr. R. J. Tillyard, F.R.S.

2. "Some remarks on the Devonian fossil insects from the Rhynie Ch~~u~~er~~s~~t Beds, Old Red Sandstone," by Dr. R. J. Tillyard, F.R.S.

3. " Revision of the European Bees allied to *Psithyrus quadricolor*," by Mr. O. W. RICHARDS, B.A.

4. " Notes on the Odonata of Yunnan, with descriptions of new species," by Mr. K. J. MORTON.

5. " Collected records relating to insect migration," by Mr. C. B. WILLIAMS, M.A.

6. " *Sloperia ahmed* and *Tuttia leuzeae,* two rare Algerian Hesperids," by Mr. A. GOODMAN.

7. " On the abdominal glands in certain N. American Argynnids," by Dr. H. ELTRINGHAM, M.A.

8. " Two Japanese aquatic glow-worms," by Mr. OKADA. (Communicated by Mr. K. G. BLAIR.)

9. " Odonata of the African Continent," by Lt.-Col. F. C. FRASER, I.M.S.

10. " Polymorphism in horned beetles," by Mr. G. J. ARROW.

11. " The variability of species in the Lepidoptera, with reference to abundance and sex," by Dr. R. A. FISHER and Mr. E. B. FORD.

12. " On the systematic position of *Anomoses* (Lepidoptera, Homoneura)," by Mr. A. Philpott.

Wednesday, April 4th, 1928.

Mr. J. E. COLLIN, President, in the Chair.

Obituary.

The death of the Rev. Canon E. GROSE HODGE, a Fellow of the Society, was announced.

Election of Fellows.

The following were elected Fellows of the Society :—Miss D. AUBERTIN, M.Sc., Dept. of Entomology, British Museum (Natural History), Cromwell Road, S.W. 7; JOHN W. EVANS, The Cawthron Institute, Nelson, New Zealand; Rev. L. W. GRENSTED, M.A., B.D., University College, Oxford.

Exhibits.

FACTORS THAT CONTROL THE HATCHING OF THE EGGS OF *AËDES ARGENTEUS*.—Mr. P. A. BUXTON exhibited living dried eggs of the Yellow Fever Mosquito (*Aëdes argenteus*), the larvae from which emerged during the course of the meeting. He also made some remarks on the different factors that precipitate the emergence of the larva from the egg-shell.

CALCAREOUS INSECT PUPARIA.—The SECRETARY on behalf of Mr. G. J. ARROW exhibited some remarkable calcareous insect puparia from Australia and read an account of these by Mr. A. M. LEA, published in *The Records of the South Australian Museum,* vol. iii, p. 35. This author is of opinion that the majority of these puparia are formed by a large weevil, *Leptops duponti,* Boisd.

A WIDELY-DISTRIBUTED SEA-MIDGE.—Mr. F. W. EDWARDS exhibited a specimen of the Chironomid fly, *Telmatogeton sancti-pauli*, Schin., recently received at the British Museum from Cape Town. The species was first found in St. Paul Island, south Indian Ocean, and until recently had not been known to occur elsewhere, the genus remaining unrecognised. Examination of co-typical material has now shown that *Trissoclunio fuscipennis*, Kieff., from Cape Town, is the same species, and we apparently have an interesting case of natural dispersal of a small fly over a wide area of ocean, as the introduction of the species to St. Paul Island is not likely to have been brought about by human agency.

The SECRETARY read a letter from Prof. T. D. A. COCKERELL giving an interesting account of his experiences while insect-collecting in Siam.

The PRESIDENT exhibited a cabinet drawer containing his collection of British BORBORIDAE (Diptera). He gave an account of some of the more interesting species, and referred to the fact that while most Diptera were scarce during the winter months many species of BORBORIDAE could be obtained at that time by searching heaps of cut sedge or litter and heaps of leaves or other refuse in gardens and other places.

Wednesday, May 2nd, 1928.

Mr. J. E. COLLIN, President, in the Chair.

Obituary.

The death of Mr. C. C. GOWDEY, a Fellow of the Society, was announced.

Exhibits.

A RARE BRITISH DIPTERON.—MR. DONISTHORPE exhibited a number of specimens of the rare Syrphid, *Pocota apiformis*, Schr., with their empty puparia, and a larva in spirit. He had reared the flies from larvae taken in the centre of a large ash-tree in Windsor Forest on February 8th, 1928. The larvae, which possess a short " rat-tail," occurred in a damp part in the middle of the tree, some 50 ft. up. They were accompanied by the larvae of *Ludius ferrugineus*, which he had proved by experiment to devour the fly larvae. He had kept the *Pocota* larvae in a tin with very damp frass, and when they were ready to pupate they came to the top of the frass, which was drier. Larvae which pupated on February 11th, emerged as perfect insects on April 5th and 6th. Other specimens emerged on April 8th, 17th and 19th. He understood that this Syrphid was considered to be very rare in Britain, and that there are very few records of its capture.

BUTTERFLIES FROM JAVA BEARING EVIDENCE OF ATTACKS BY BIRDS OR LIZARDS.—Prof. POULTON exhibited specimens of *Melanitis leda* and *Clerome arcesilaus*, F., kindly given him by the captor, Mr. C. L. Collenette. The *Melanitis*, taken at the Buitenzorg Botanic Gardens, 17 April, 1922, showed a symmetrical notch in the margin of both hind-wings. The injury had evidently been inflicted by a bird or izard when the butterfly was at rest or when the wings came together in flight. The hind-wings of the *Clerome* had been symmetrically shorn in a manner which is characteristic of a bird attack such as that described in *Proc. Ent. Soc. Lond.*, ii, 1927, p. 11. (See also the references there quoted.) The injured specimen, taken 19 April, 1922, at Mt. Gede, Tjibodas (1500 ft.), suggests a reason for the habits described by Mr. Collenette in the following interesting extract from his diary, written on the day following the capture :—

" A large species of *Clerome*, with very dark underside. These were settled on a path in the darkest part of the jungle. A number of small juicy fruits were on the path from a tree overhead. The butterflies were settled away from the fruits, but were apparently sucking juices from the completely decomposed ones which had soaked into the wet leaves. They took alarm when I was six or eight feet away and flew off into the jungle, returning in five or ten minutes. They resembled the dead leaves so exactly, and the light was so bad, that usually I could not detect them before they flew. It was interesting that insects so well protected should be easily alarmed, although I was dressed in khaki. There was less life in this jungle than in the more open parts, but I did not see *Clerome* except at this spot."

A left fore-wing of *Papilio l. leonidas*, F., which Prof. Poulton had intended to exhibit, but was temporarily mislaid, would be brought to the next meeting. It had been sent by Dr. Malcolm Burr, who had written the following note—" This butterfly wing came floating down among the trees, presumably nipped off by a bird in the forest. Chisorwe, Luano Valley, N. Rhodesia : 20 January, 1928." Although the wing bore no apparent beak-mark, its perfect condition suggested that it had been removed by a bird rather than by any other enemy.

A MALAYAN DRAGONFLY TAKEN IN THE ACT OF DEVOURING A NYMPHALINE BUTTERFLY, *NEPTIS HYLAS*, L.—Prof. POULTON exhibited the captor and its prey, which had been kindly sent to him by Mr. F. F. Laidlaw with the following note :—

" 24 *January*, 1928.—Amongst some Odonata recently sent to me from the Federated Malay States Museum for identification is a specimen of the common Libelluline dragonfly *Orthetrum sabina*, Drury, which has the mangled remains of a Neptid butterfly in its jaws. The collector [Capt. H. M. Pendlebury] has noted ' caught in the act of devouring a *Neptis* butterfly : 7.ix.1924. Kepong, 9th mile. H. M. P.' "

The specimens were especially interesting because butterflies as compared with other insects seemed to be rarely taken by dragonflies. The remains of the *Neptis* were, with Capt. N. D. Riley's kind help, made out to be those of *N. hylas*, L. (*eurynome*, Westw.).

AN OBSERVATION ON THE CONDITIONS PRECEDING THE PAIRING OF *SATURNIA CARPINI*, SCHIFF.—Prof. POULTON said that he had received the following account of an observation by Dr. G. V. Bull, B.A., M.B., bearing on the notes in *Proc. Ent. Soc. Lond.*, ii, 1927, pp. 75—82.

" 5 *April*, 1928.—A female *S. carpini* (from a Rannoch larva) emerged. Next day I put her in a small cage ($4\frac{1}{2}$ in. × 3 in. × 3 in.) and took her out to a heather patch six miles from Sandhurst, Kent. No males assembled and none were to be expected, as my pupae had been kept in a warm room and the moth emerged so early. On my return I found that a male had emerged in the same breeding cage (16 in. × 12 in. × 12 in.), where he was sitting quietly and apparently did not scent the female. I put him into the small cage containing the female, and he dashed about and quickly spoilt himself; but within ten minutes the moths were *in copulâ.* Eggs were laid the same evening and larvae emerged last night (21 April)."

It was probable that the disturbance of the male, leading to his flight and continual violent contact with the sides of the small box, quickly brought on the condition necessary for his appreciation of the female scent.

A MALE BEE *ANTHIDIUM SEPTEMDENTATUM*, LATR., BEARING ON ITS HEAD THE POLLINIA FROM TWO ORCHIDS OF THE GENUS *SERAPIAS*.—Prof. POULTON exhibited the male specimen of this bee, kindly sent to him by Col. M. J. Godfery, F.L.S., who had written the following account :—

22nd April, 1928. *Hôtel Continental: Hyères.*

"The bee was caught in a flower of *Serapias cordigera*, De Not., 18 April 1928, by Col. G. H. Evans, at Valescure. It bears the remains of no less than five pairs of pollinia. Some of these are pollinia from flowers of *Serapias neglecta* (these are green), and at least one pair is from a flower of *Serapias cordigera* (purplish). It is the first example I have seen of an insect bearing the pollinia of one species (*neglecta*) and caught in the flower of another species (*cordigera*). It is a pretty example showing how natural hybrids arise."

Col. Godfery, in the same letter, had also drawn attention to the following observations in Australia :—

"There is an interesting note by Dr. Rendle in the April 1928 number of the *Journal of Botany* (p. 119), on the pollination of an Australian orchid, on lines parallel with those described by me in respect of the section *Pseudophrys* of the genus *Ophrys* (*O. fusca, lutea* and their allies)."

THE EPIGAMIC DISPLAY OF A MALE DRAGONFLY *LIBELLAGO CALIGATA*, SELYS, OBSERVED BY DR. G. D. H. CARPENTER IN TORO, UGANDA.—Prof. POULTON communicated the following interesting observation and exhibited a male and female of the dragonfly, which he had received from his friend Dr. Carpenter.

22 *Jan.*, 1928. *Entebbe.*

"On 2 January the beautiful male of this species was watched courting the dull-coloured female on the bank of the Mpanga River, where it flows through Kibale forest a few miles from Fort Portal, in the Western Province of Uganda. The abdomen of the male is of an intensely brilliant cobalt-blue, narrowly ringed with black segmental bands. In this lovely species the tibiae are much flattened and expanded, of a brilliant shining white anteriorly and equally brilliant carmine posteriorly.

"A female, coloured uniformly dull grey-brown, was sitting on a horizontal twig just above the water, as is the habit of this genus. The male came up from behind and then turned, hovering about two inches in front of her and describing a small arc of a circle of which the female was the centre, passing repeatedly from side to side and always facing her. All the legs were held so as to display the shining white anterior surfaces of the tibiae, presenting a curious appearance. I did not witness the end of the display as I attempted to catch the actual specimens for record. In this I failed, but others were obtained.

" The interesting point arises, what use is made of the carmine *posterior* surfaces of the tibiae ? Does the colour have an effect upon the female when the male has grasped her preparatory to copulation ? She is then directly behind him and would see the bright carmine colour.

" The genus *Libellago*, in Uganda, frequents swiftly moving streams, well shaded by overhanging bushes. The species seek the sunlit spots and sit upon twigs and grass near the water's surface, dashing off for brief flights after their prey, when the brilliant males are of surpassing beauty."

The species of *Libellago* had been named for Dr. Carpenter by Col. F. C. Fraser, I.M.S. The long series of *caligata* in the British Museum showed a wide distribution in Africa, and it was therefore to be hoped that these most interesting observations would be repeated and extended in the near future. It was likely that, among all the species of *Libellago* in the B.M. collection, *caligata* was the only one possessing these remarkable expanded tibiae ; for the single example of *L. sulphuripes,* Martin (a male from the Transvaal), might be an immature example of *caligata,* as the author had suggested on the label, and as Mr. D. E. Kimmins thought probable. The tibial plates of *sulphuripes* were smaller than those of *caligata* and white instead of carmine on the posterior surface.

The few earlier observations on epigamic display in dragonflies were quoted in Mr. O. W. Richards' valuable memoir " Sexual selection and allied problems in the insects " (*Biol. Reviews,* vol. ii, No. 4, Oct. 1927, Cambridge, pp. 307, 311). In all previous records (by Laidlaw, Williamson, and Tillyard) there was a display of white surfaces or spots by the male preparatory to the seizure of the female and adoption of the " tandem " position. In only a single species, the Australian *Hemiphlebia mirabilis,* Selys, was the female observed to make any display in response to the male. The courtship habits of this little Odonate were thus described by Dr. R. J. Tillyard, F.R.S. :—

" This metallic green Dragonfly is almost invisible on green reed-stems, except for its long ribbon-like white appendages (fig. 14L). These are displayed as a sign to the female, by raising the abdomen and bending it slightly sideways, while walking up the reed-stem. The female replies by moving the whitened end of her abdomen from side to side in a peculiar manner. Finally, the little creatures fly out from the reeds, and engage in a miniature ' pas de deux ' before pairing " (" The Biology of Dragonflies," Cambridge, 1917, p. 326).

Dr. Tillyard had given a somewhat more detailed account in *Proc. Linn. Soc., N.S.W.*, 1912 (37), pp. 463, 464, where he states that he had twice seen a female seized by a male after display. The superior white appendages were used as claspers, the inferior being apparently too weak and ribbony. It is evident that by " pairing " Dr. Tillyard was referring to the " tandem " position and not to coitus. Indeed, until this latest observation of Dr. Carpenter's, nothing had been recorded which suggests a second display to provide a stimulus in the second stage of courtship, leading to coitus. It was impossible to resist his conclusion that the carmine surfaces of the tibial plates of *L. caligata,* seen from behind, do provide such an epigamic stimulus in this very stage, while their brilliantly white anterior surfaces, displayed as described by him, provide it in the earlier stage. It was, moreover, of much interest that white surfaces or spots have been prominently exhibited by male dragonflies in all the recorded examples of display at this earlier stage of courtship. The passage from white to carmine for the two stages of *caligata* was not only significant in epigamics; in was equally so in its bearing on the vision and appreciation of colour by insects, and upon comparative physiology and psychology. Just as the epigamic scents of male butterflies, presumably pleasing to their females, were also pleasing to man, so was it with these appeals to the much higher sense of sight.

Major R. W. G. Hingston showed a lantern slide to demonstrate the various stages of a mimetic Indian grasshopper.

Mr. G. Talbot gave an account, with lantern illustrations, of an entomological journey through the Great Atlas of Morocco.

Wednesday, June 6th, 1928.

Mr. J. E. Collin, President, in the Chair.

Mr. Edelsten made a statement as to the progress that was being made with the establishment of *Chrysophanus dispar* at Wood Walton Fen. He said that it would be necessary to raise a fund for some of the expenses connected with it, and made an appeal to the Fellows for contributions.

Exhibits.

A remarkable larva from California.—Mr. E. E. Green said: "In the *Canadian Entomologist*, for December 1927, Mr. G. F. Ferris, of Stanford University, figured and made some observations upon a very remarkable larva, the affinities of which were—and still are—unknown.

"Feeling sure that the Fellows of our Society would welcome an opportunity of seeing this curious insect, I asked Mr. Ferris if he could spare one or more specimens for the purpose. He has very kindly responded by sending me a living specimen and a beautifully mounted preparation of the larva, and has supplied the following notes to accompany the exhibit:—

"'This curious larva was first recorded and described by H. S. Barber in 1905 from specimens taken from beneath the dead leaves of a tree yucca in the Mojave Desert in California. I have recently recorded it again from various localities in California, Utah and Mexico, usually from beneath bark of trees. It is apparently rather widely distributed. Thus far nothing is known concerning its affinities. Barber and Böving regard it as the larva of a beetle belonging in or near the LAMPYRIDAE.

"'These specimens which are here shown were taken in May 1927 from crevices among rocks near Friant, California. An attempt has been made to keep them alive with the hope of securing further information concerning them. Some of them are still alive at this date (May 1, 1928), but they have in the course of the year neither taken food nor moulted. Observations made at the time the specimens were secured indicated that they are carnivorous, feeding on small insects, but they have paid no attention to the various kinds of small insects that have been offered them.

" 'I have recently received from Rao Sahib Y. Ramachandra Rao, Government Entomologist of Coimbatore, India, a very interesting letter having a bearing upon these insects. He informs me that he found a number of years ago specimens of an insect apparently very similar to this. From his larvae he reared beetles that were apparently Lampyrids. The larvae were found beneath the bark of tamarind trees. He informed me that he was sending specimens for comparison with the American species, but at the time of this writing they have not been received and are perhaps unfortunately lost in the mails. He stated that specimens of the adult had been sent to Dr. G. A. K. Marshall for identification.

" 'It has been suggested to me that possibly these curious larvae belong to some form that never develops into typical adults, remaining always in a larval condition. This is possible, but Ramachandra Rao informs me that he reared adult males and females from his species. If there actually be a relationship between the two forms, it would appear that further investigation may reveal them in the American species.'

"With regard to the supposed Indian congener, Dr. Marshall informs me that Mr. Ramachandra Rao submitted examples of the beetle in question, and that these were identified by Mr. Blair as an Elaterid of the subfamily LEPTUROIDINAE. Unfortunately, no specimens or description of the larva accompanied the adult insects.

"Mr. Ferris's notes may be supplemented by a few extracts from his published paper. Referring to the original discovery of the insect, in 1905, Mr. Ferris tells us that 'specimens of this larva were taken to Washington, where one of them remained alive without taking food for a period of twenty-six months.' Of their habits he writes as follows :—'They sit motionless on the rocks, and even when disturbed their only reaction is to lift their tails. When they do move about the motion is so slow as to be almost imperceptible. While the mouth-parts are of a character which indicates a predaceous habit, their slow movements would seem to handicap them most seriously. Nevertheless, I saw one with a very small spider in its jaws and another with a minute Hymenopteron. In both cases the prey was held up in the air much after the manner of an ant-lion.'

"Mr. Ferris was able to obtain nearly a hundred living larvae. They were of all sizes, ranging from minute specimens scarcely more than a millimetre long to others with an over-all length of eleven millimetres. Many shed skins were present, showing that the larvae were in several stages."

ADDITIONAL NOTES ON ALL-FEMALE FAMILIES IN CERTAIN INSECTS.—Dr. J. G. MYERS said : "As a small addition to Prof. Poulton's very suggestive recent communication on this subject, it may be of interest to present the following further cases gathered from the literature.

"We have long been familiar with all-male families arising from parthenogenetic eggs in the parasitic Hymenoptera. As recently as 1923, Wheeler (p. 46) stated that these parthenogenetic eggs 'as a rule, if not always, . . . develop into males. . . .' We now know that, while this remains a general rule, there are very many exceptions, especially among the species which are usually hyperparasites. Muesebeck and Dohanian (1927) found that different species of the same genus may vary as to the sex of offspring produced from unfertilised eggs. They found the following species to be regularly thelyotokous, no males being discovered at all: *Hemiteles tenellus*, Say (ICHNEUMONIDAE), *Eupelminus saltator*, Lind. (EUPELMIDAE, Chalcidoidea), *Anastatus pearsalli*, Ashmead (EUPELMIDAE) and *Pleurotropis nawaii*, Ashmead (EULOPHIDAE, Chalcidoidea). Balduf (1926) found the Braconid, *Dinocampus coccinellae*, Schrank, to produce nothing but females, no males being observed. Faure (1926) records the Ichneumonid, *Pezomachus instabilis*, Forst., and lists also *Hemiteles longicauda*, Thoms., *Hemiteles* sp. and *Nemeritis canescens*, Th. (all ICHNEUMONIDAE) as thelyotokous. He quotes Mokrzecky (1916) who reared, from 1913 to 1916, fifty generations of *Trichogramma fasciatum*, Per., without obtaining a single male. Faure thinks it probable that, whatever be the final decision as to the number of species, there are in Europe three biological races of the common *Trichogramma*, one of which is arrhenotokous, another thelyotokous, and a third able to produce both sexes parthenogenetically. In still another Chalcidoid, *Syntomosphyrum glossinae*, Waterston, Lamborn occasionally obtained broods of all one sex. Thus 'two puparia of *Sarcophaga*, for example, submitted to one female afforded 13 and 20 males respectively, and in other instances all-male broods of 37, 37 and 37 were recorded, also from *Sarcophaga*.' This, of course, was probably one of the more usual cases where unfertilised eggs produced males. Lamborn did not examine the question of parthenogenesis, but thought it very probable that such occurred.

"It is possible that the phenomena of thelyotoky and arrhenotoky may throw some light on the occurrence of one-sexed families produced without the intervention of parthenogenesis, as in Prof. Poulton's examples. The following cases are, however, more directly in line with the latter :—

"Fletcher (1917) found that an Indian species of *Chrysomyia* (CALLIPHORIDAE) was 'in the habit of producing progeny of one sex only.' He proved that there was no parthenogenesis, and said further that, 'under the same climatic conditions in captivity one female will produce only males whilst another will produce females, which seems to show that climatic conditions do not take any part in the causation of sex in this insect.'

"Parker (1918) gives the numbers of various species of flies which emerge from one privy-vault in Montana. In all the species females greatly predominated. The following are the most striking of his figures :—

"*Lucilia sericata*, Mg., 678 females, 1 male; *Lucilia caesar*, L., 120 females, no males; *Musca domestica*, L., 564 females, 197 males; *Muscina stabulans*, Fall., 1078 females, 274 males.

"Parker does not suggest any explanation for this disparity, but I think it is more than possible that it may indicate broods of one sex; and since none of these flies are known to be parthenogenetic, there would perhaps be a similar preponderance of males somewhere else. In carrion-feeding forms especially, such tremendous numbers sometimes emerge from one small carcase which has been 'blown' by comparatively few female flies, that were the offspring in the usual nearly equal proportions of the sexes, the closest inbreeding would tend to result."

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LARVAE OF BRITISH DRAGONFLIES.—Dr. J. E. H. ROBERTS exhibited and made remarks on the larvae of *Somatochlora metallica* and *S. arctica*.

A REMARKABLE PREDACEOUS LARVA FROM INDIA.—Mr. G. J. ARROW exhibited a remarkable raptorial larva, with drawings of it sent by Mr. T. BAINBRIGGE FLETCHER, Imperial Entomologist, India. It was found at Gantok, Upper Sikkim, by Colonel Bailey, who was attracted by the movements of an earwig, and, on close examination, found it in the grip of the larva, of which only the anterior end protruded from a tunnel bored in a twig. From the similarity of its habits to those of certain Collyrine Tiger-beetle larvae, it was supposed, although very different, to be a beetle larva, but this is not so, and Mr. D. E. Kimmins, who has a special knowledge of the Neuroptera, has expressed the opinion that it probably belongs to the PANORPIDAE (Scorpion-flies).

MR. H. W. SIMMONDS' CONCLUSION THAT ALL-FEMALE-PRODUCING FEMALES FORM A PERSISTENT STRAIN IN SUVA, FIJI.—Prof. POULTON communicated Mr. Simmonds' important conclusion arrived at after a long series of breeding experiments conducted at Suva, Viti Levu :—

29 *March*, 1928.—" I think we can now assume that the all-female-producing females pass on this quality to their female descendants *ad infinitum*." Mr. Simmonds had also proved that the male parent, although powerless to affect the sex of the offspring produced by such a female, has a marked influence upon the female forms in the family. Thus, referring to the Family X. 2, of which examples were exhibited to the meeting, he wrote in the same letter :—" My X. 2 all-female

family has emerged and proved a most interesting one, as it distinctly shows the influence of the K. 7 male parent."

This all-female family, emerging in March, 1928, contained the following forms :—

A—2 *naresi*, both exhibited to the meeting.

B—10 *nerina*-like, of which the specimens with most, intermediate, and least "*nerina* red" were exhibited.

C—14 resembling the Australian female form *imperialis*, Illidge, with blue oblique F.W. band and "*nerina* red." Of these three specimens showing the variation of this last marking were exhibited.

D—5 similar to the last form but without "*nerina* red" in F.W. Two were exhibited.

Scattered blue scales with or without traces of a "mirror" appeared on the H.W. of some specimens in C and D.

The history of the family was as follows :—a wild female resembling one of the 5 females in D, became the parent, X., of the all-female family X. 1, containing 3 *naresi* (with a trace of "*nerina* red" in two) and 5 resembling the parent. One of these five became the female parent of X. 2 and clearly influenced the forms of offspring in A, C and D. All the seven females in the mixed family K. 6, from which the male parent of X. 2 was selected, were strongly marked *nerina*-like forms. The influence of this male doubtless explains the 10 females in B and perhaps the "*nerina* red" in the females of C. It was necessary, however, to take into account the slight trace of this marking in two *naresi* females of Family X. 1.

The continued presence of male *bolina* in Viti Levu was referred to in some of the following extracts from Mr. Simmonds' letters. Although the later of these were received after the meeting of 6 June it was thought that the inclusion of extracts from them would be convenient.

24 *May*, 1928.—"We had six weeks continuous rain, followed by two or three weeks of glorious sunshine. The rain seemed disastrous to *bolina*, as since then I have only seen 4 or 5 males, until yesterday, when I saw a single female. All these males were worn and undoubtedly had emerged before the rain set in, but the female was fresh."

31 *May*, 1928.—"I have just been round the Circular Road and saw three males, two aged, one fresh, and two females, both fresh. I did not catch either, but one was a nice yellow and white form. The butterfly is, however, now scarce."

6 *June*, 1928.—"I captured a male-like female *bolina*, but she was empty and died. I missed a beautiful form the same day, when I saw altogether three females and no males."

1 *August*, 1928.—"*Bolina* is somewhat scarce, but I have two families in hand. These are A and B, new series."

The following extract from the letter of 1 August refers to the suggested difference between the feeding habits of the male and female *bolina*, published in *Proc. Ent. Soc. Lond.*, II, 1927, p. 74.

"I find too many exceptions to the observation that the male extends the proboscis more readily than the female to think there is much in it."

THE DRY AND WET SEASON FORMS OF *PRECIS OCTAVIA SESAMUS*, TRIM., TAKEN *IN COITÛ* AT NAIROBI.—Prof. POULTON exhibited a male of the dry season form *sesamus*, and a female of the wet form *natalensis*, Staud., captured *in coitû* by Mr. G. H. E. Hopkins, M.A., at Nairobi, Kenya Colony, on 29 September, 1927. Both specimens were of the full seasonal form. Such pairings appeared to be extremely rare, and the example exhibited to the meeting was the first he had seen. The earliest record known to him was that of a capture by Mr. F. N. Streatfield, published together with an account of intermediate forms, in Trimen's *South African Butterflies*, 1887, pp. 231–233.

PREDACEOUS INSECTS CAPTURING THE AFRICAN FORM OF *APIS MELLIFICA*, L., IN KENYA COLONY.—Prof. POULTON exhibited three females of the Fossorial wasp *Philanthus triangulum*, F., each carrying as its prey the wild African Honey-bee. Two were taken at Nairobi by Mr. G. H. E. Hopkins in April, and on 27 May, 1927, respectively, and the third collected by him and Mr. Symes on 3 May, 1927. Also, captured by Mr. Hopkins at Machakos on 12 February, 1928, a male of the Asilid fly *Laxenecera* sp. (LAPHRINAE) carrying the same prey.

THE AREA, IN THE WEST NILE PROVINCE OF UGANDA, FROM WHICH START THE GREAT SOUTHWARD MIGRATIONS OF *BELENOIS MESENTINA*, CRAM., IN UGANDA AND KENYA COLONY.—Prof. POULTON said that the discovery of this area by Capt. C. R. S. Pitman was of great interest. Migrations of *mesentina*, in 1922, 1924 and 1926, which almost certainly started from the West Nile Province (the old Lado Enclave), were described in *Proc. Ent. Soc. Lond.*, 1924, pp. xxxi, xxxii; Vol. I, 1926, pp. 8, 9; Vol. II, 1927, pp. 43, 44; Vol. III, 1928, p. 17. Capt. Pitman's graphic account of the crowded breeding-grounds was contained in the following extracts from his letter, which accompanied the specimens exhibited to the meeting.

"2 May, 1928: Entebbe.

"I am sending specimens of Pierines collected on 14 March, 1928, and again on 31 March, 1928—together with bush-twigs covered with chrysalises, and samples of the larval food-plant. One can only describe as amazing the vast breeding-grounds encountered. On 14 March, in dull weather, at about 11.0 a.m., I crossed a huge grassy plain some two miles broad and possibly seven to ten miles in length. This area had evidently been burnt out some weeks previously, and with the aid of a few showers of rain the countless shrubs (as per sample) on which these Pierine larvae feed were in full, tender leaf and flower. I have never before seen such countless myriads of butterflies, and as far as the eye could see there was a shimmer of white just above the surface of the ground. The majority of the food-shrubs seemed practically leafless—larvae and chrysalises were to be seen everywhere, as also countless thousands *in cop*. It struck me at once that such a breeding area must most certainly be the source of some of the numerous Pierine migrations so frequently witnessed in this part of Africa. The above area lay some dozen miles inland from the River Nile. On 31 March, 1928, in savannah-land and short grass country near Powaa and Mutir (left bank of Nile) I noticed that the bush twigs and tall grass-tops were literally decorated with dozens and dozens of Pierine chrysalises, and that at 7.0 a.m. on a fairly bright morning the insects were hatching out in tens of thousands and were *in cop.* within a few minutes of their wings drying, and their taking flight. I also captured a newly hatched *Teracolus* which I send. All the types of Pierines associated with this crowd (most of these species I have previously sent to you), were breeding, but amidst the myriads of *Belenois* they were barely noticeable! Again, a few days later in savannah-land, eight miles W. of the Nile, and south of Rora, I came across the same countless thousands of butterflies, chrysalises and larvae. One must visit such an area and witness such a scene in order to appreciate or even believe it. A few notes on weather conditions are of importance.

"West Nile, in common with the rest of Uganda has been in the throes of drought for nearly twelve months! In December and January, according to custom, the whole of the West Nile Province was burnt out by grass fires. In the first week of March there were a few heavy thunder showers, after which the weather continued exceptionally hot and dry. There were a few showers in the middle of the month (especially on the breeding-ground visited on 14 March), and some more rain at the end of the month. A couple of days' rain fell on 6–7 April, more on 10–11 April, and the rains really broke on 15 April. I shall be only too pleased to furnish any further information on the subject, if available."

The label accompanying 6 ♂, 1 ♀ papered specimens of *mesentina* and 1 ♂ *Teracolus phlegyas*, Butl., exhibited to the meeting, was as follows :—"31.iii.1928.—Powaa, West Nile, Uganda, 1200 ft. (Old Lado Enclave).—Myriads of these hatching out of chrysalids just after dawn on an amazing breeding-ground. Rains threatening, at end of Dry Season and 12 months of drought." In addition to these specimens, Capt. Pitman had sent many twigs crowded with Pierine pupae and further examples of *mesentina* of which 2 ♂, 10 ♀ were exhibited with the pupae; also 1 ♂, 3 ♀ *mesentina* labelled "14 March, 1928: Gimara, Ruwongo"—evidently the "huge grassy plain" referred to in the opening sentences of Capt. Pitman's account of the breeding-grounds.

Capt. Pitman's conclusions were confirmed by the small size of the butterflies, especially those sent with the pupae, and evidently due to starvation following the over-population described by him. The migrating *mesentina* which had been captured in former years far south of the area were also small, some of them resembling the smallest of those taken on 31 March, 1928. Thus, of the five female *mesentina* flying over an escarpment from the Rift Valley in Kenya Colony at the end of January 1926 (*Proc. Ent. Soc. Lond.*, Vol. II, 1927, pp. 43, 44), three were rather small specimens and two very small and starved-looking.

The specimens of the food-plant were sent to the Herbarium at Kew, and Dr. A. D. Cotton had kindly written :—"The species is *Maerua oblongifolia*, A. Rich., a member of the Capparidaceae, and known from the locality you state, viz. near the Uganda–Sudan border."

THE FIRST AFRICAN RECORD OF THE AMERICAN "CLOTHES-MOTH" *TINEOLA UTERELLA*, WLSM.—Prof. POULTON exhibited the larva-cases of this Tineid moth sent to him by Capt. C. R. S. Pitman with the following note :—

"*Entebbe: 1 May*, 1928.—I am sending a couple of tiny larva-cases which are found all over the distempered walls of our houses. What these larvae become I don't know, as so far I have not been able to breed them."

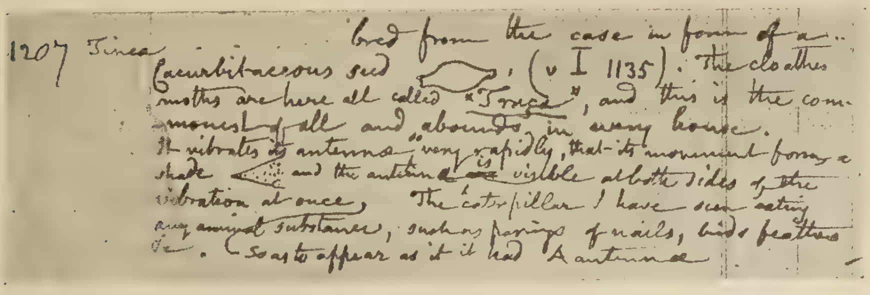
Mr. H. Stringer had kindly compared these cases with American specimens in the British Museum Collection and had no doubt that they were constructed by larvae of the species *Tineola uterella* hitherto known from America. Although Capt. Pitman's was the first African record, Dr. G. A. K. Marshall had informed him that he distinctly remembered finding larvae in similar cases crawling up the outside of his house at Salisbury, Mashonaland, but did not recall finding them inside the house nor remember breeding them out; also that Dr. Lamborn had sent him similar cases from Nyasaland, but no moths associated with them. These cases were handed over to the British Museum some years ago, but, as there were no indications that they were Microlepidopterous, it would be difficult to find out what was done with them.

Dr. Neave had also written: "I do not know that my experiences of the African 'Clothes-moth' amount to very much, and I have no exact notes about them. My recollection is that the cases were not uncommon on the inside mud walls of rest-houses and native huts in Uganda, and I think also near the coast north of Mombasa. I do not remember seeing them in Northern Rhodesia or Nyasaland."

THE EARLIEST ACCOUNT (IN MS.) BY W. J. BURCHELL OF THE AMERICAN CLOTHES-MOTH *TINEOLA UTERELLA*, WLSM.—Prof. POULTON said that he thought it would be interesting to reproduce Burchell's excellent account of this larva written in 1826 and 1827 in his Brazilian note-book. His Brazilian Collection in the Hope Department contained many of these larva-cases labelled by him "16.6.27: 1207"; also one moth with Burchell's "1207," determined by the late Mr. J. H. Durrant. The entry in the MS. Brazilian note-book, written 16 June, 1827, at S. Paulo, is as follows:—

"1207 Tinea . . . bred from the case in form of a Cucurbitaceous seed (v I 1135). The cloathes moths are here all called "*Traça*," and this is the commonest of all and abounds in every house. It vibrates its antennae so very rapidly, that its movement [viz. of each antenna] forms a shade and the antenna is visible at both sides of the vibration at once so as to appear as it [if] it had 4 antennae. The caterpillar I have seen eating any animal substance, such as parings of nails, birds feathers &c."

The above paragraph is reproduced below:—



1207 Tinea . . . bred from the case in form of a
Cucurbitaceous seed , (v I 1135). The cloathes
moths are here all called "Traça", and this is the com-
monest of all and abounds in every house.
It vibrates its antennae very rapidly, that its movement forms a
shade and the antenna ~~are~~ is visible at both sides of the
vibration at once, The caterpillar I have seen eating
any animal substance, such as parings of nails, birds feathers
&c. So as to appear as it it had 4 antennae

Burchell's earlier note "1135" written at Santos, 1 December, 1826, is quoted below :—

"1135 *Aleucita* . . . (1207) . . .

"The case of the caterpillar flat and like a gourd-seed, open at both ends. Caterpillar never quits the case, drags it about, in any direction, but in difficult places, as up a wall &c. it sometimes secures one end by an extensible fine thread, then drags on at the other end till thread breaks by extension; secures other end if it required, and when both ends fast, it draws itself within[,] pulling in after it one margin of the orifice which closes the opening against intruders. It then turns round end for end, the object of the wide shape of the case, and popping its head out at the other opening which till then had been closed in like manner, it examines (by stretching its body half way out) if its house can be dragged in that direction or if another thread is necessary. It is an active creature: has no hind legs; only the six fore ones. The 3 or four first articuli of the body are of a dark chocolate color in the middle, the rest of the body white and all hairless. It attaches its case generally on side of a wall (in houses), or indeed in various situations, to pass to the moth state."

Mr. H. Stringer had kindly directed his attention to Lord Walsingham's account of the habits of the larva in the following passage from *P.Z.S.*, 1897, p. 165 (Jan. 1897) :—

"Bred by Messrs. Schulz, Gudmann, and Baron von Hedemann. Mr. Gudmann notes it as found 'on trunks,' while Mr. Schulz writes :—'The Amazonian clothes moth, their larva and pupa-cases called "tracas" in Portuguese. These tracas are very frequent in houses in Pará, keeping on the walls of the rooms and are very injurious to clothes.' All three observers send with this species a flattened bladder-shaped case composed of silk and grains of sand, wide in the middle, narrowed towards each extremity and open at both ends. *Oecia maculata*, Wlsm., a species which although belonging to a different family is almost inseparable from *uterella* in colour and markings, is found likewise in St. Thomas and at Pará at the same time as *uterella*. Baron von Hedemann writes of *Oecia maculata*, 'very common on the inner walls of nearly every house in St. Thomas'; Mr. Schulz, who apparently did not distinguish the two insects, notes *uterella* as the domestic species; while Mr. Gudmann found it on the trunks of trees; and Baron von Hedemann, who found the cases very common on the inner walls of houses, only succeeded in breeding one specimen. The larva of *maculata* is unknown."

In the above-mentioned paper Lord Walsingham had described *Tineola uterella* from St. Thomas, W. Indies, and Pará, Brazil, but Mr. Stringer had informed him that, in addition to these localities, the British Museum now possessed examples from Cordova, Vera Cruz, Mexico, and Tabernilla, Canal Zone, Panama.

TWO INSECT PESTS IN TROPICAL AFRICAN HOUSES.—Prof. POULTON exhibited the specimens referred to in the following extract from Capt. Pitman's letter of 2 May, 1928 :—

"I also send in a pill-box two cockroaches which were found eating the bodies of dried moths and butterflies in a drawer. These cockroaches also eat away the shell round the blowing holes of fragile birds' eggs, and also eat through the thin shell of land and water molluscs to get at the dried meat they contain."

Dr. Hanitsch had studied the cockroaches, which were labelled "Feb. 1918: Entebbe," and found them to be females of a new species of *Ischnoptera*, near *bimaculata*, Gerst.*

Referring to another insect pest, Capt. Pitman expressed his concurrence with Dr. E. E. Evans Pritchard's suggestion in *Proc. Ent. Soc. Lond.*, II, 1927, p. 58; III, 1928, p. 10, writing, in the same letter—"I should think that the small, red house-ant was the culprit responsible for eating out the scent-brands of male Danaine butterflies."

AN AGARISTID MOTH WHICH AT REST RESEMBLES THE LARVA OF A GRASSHOPPER (ACRIDIIDAE).—Prof. POULTON exhibited the moth *Aegocera rectilinea*, Boisd., and conspicuous larval forms of the grasshopper *Zonocerus variegatus*, L., referred to by Capt. Pitman in the following extract from his letter of 2 May, 1928:—

"I am sending a tube of spirit-preserved grasshopper larvae, and other specimens in papers: also one example of a small moth which mimics these larvae. This moth was well distributed and fairly common, though I only managed to secure one specimen. The young grasshoppers swarmed in thousands on a kind of borage."

The spirit specimens were labelled "29.ii.1928.—Laropi, R. Nile, Sudan–Uganda border, 1200 ft. A type of immature Grasshopper, very distasteful to birds, which is mimicked by a small moth." The moth and larvae in papers—"24.ii.1928.—Rhino Camp, R. Nile, old Lado Enclave, Uganda, 1200 ft." Another label with the moth was as follows:—"When at rest with folded wings it mimics admirably the young of a highly coloured grasshopper which is found in this district on a variety of wild cotton. The grasshopper is very distasteful to birds."

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* **Ischnoptera pitmani**, sp. n.

♀. Head exposed; vertex shining black, turning to dark castaneous in the middle of the frons, a dull orange cross-band just above the labrum, labrum pale castaneous; antennae fuscous. Pronotum with the anterior border parabolic, posterior border obtusely angled; dull orange, with an indefinite **V**-shaped castaneous blotch on either side of the middle line. Tegmina exceeding the abdomen by $\frac{1}{5}$ of their length, uniform light castaneous to ferruginous; radial vein bifurcate at $\frac{3}{5}$ from its base; 16 costals, of which the 13th, 14th and 15th are ramose; posterior branch of the radial also ramose; 8 discoidal sectors; anal area pyriform, anal sulcus terminating at $\frac{2}{5}$ of the sutural margin; 6 anals. Wings pale orange, darker at the costal border; mediastinal vein long, extending to $\frac{3}{5}$ of the costal border, 4-ramose; radial vein straight, bifurcating at $\frac{3}{4}$ from its base; 9 costals, of which the 5th and the 8th are bifurcate; median vein straight, simple; ulnar vein 4-ramose, one branch going to the dividing vein, the others to the apex; apical triangle moderately developed; 1st axillary 3-ramose. Abdomen dark castaneous. Supra-anal lamina triangular, entire. Cerci stout, dark castaneous to black, 9-jointed, hirsute. Sub-genital lamina rounded, entire. Legs dark testaceous, anterior femora heavily spined, about 17 stout spines of uniform size; posterior femora and tibiae heavily spined; posterior metatarsi and tarsal joints entirely spined.

♀. Total length 15 mm.; body 11 mm.; pronotum 3·1 × 4 mm.; tegmina 12 mm.

Loc. Entebbe, Feb. 1928. 2 ♀♀.

TYPE and PARATYPE in Hope Dept., Oxford University Museum.

The colouring of this species (viz. head black, remainder of body light castaneous to ferruginous) makes it easy to distinguish it from allied species, and as it is not represented in the Oxford Museum, nor in the British Museum or those of Paris and Berlin, as on inquiry I have heard from Mr. B. Uvarov, Dr. L. Chopard and Prof. Willy Ramme respectively, I have ventured to describe it as new.—R. HANITSCH.

The pattern of the moth was characteristic of its genus, and it would be interesting to observe whether a similar association with Acridian larvae exists elsewhere in this and other species of *Aegocera*. Mr. Uvarov, who kindly determined the larva, thought it likely that the association was truly mimetic.

THE EUROPEAN CARPENTER-BEE *XYLOCOPA VIOLACEA*, L., TAKEN AT DULWICH IN 1855.—Prof. POULTON exhibited a specimen of this bee from the series of British Hymenoptera, until recently in the collection of the Entomological Club. The bee bore the following manuscript label:—

"Xylocopa violacea taken by Mr. C. Wood a gentleman gardener at Dulwich Common on the 15 June 1855 and presented to E. Newman by the captor."

The specimen had evidently been placed in the Club collection by Edward Newman, who was the curator. The Hymenoptera and Diptera, with the exception of the types, given to the British Museum, had been generously presented by the members to the Hope Department, Oxford University Museum.

BIRDS OPENING THE OAK-GALLS OF *CYNIPS KOLLARI*, HART, IN ORDER TO EAT THE INSECT CONTENTS.—Prof. POULTON said that Miss Margery Fry had informed him that she had seen the Great Spotted Woodpecker opening these galls * in order to get at the insects within them. The observation was made, in the winter of 1923–24, at Fish ponds Wood, Abbotsleigh, near Bristol. The bird was watched through field-glasses for a considerable time. The fact was of much interest, showing as it did, the amount of labour an insectivorous bird would undertake in order to obtain a very small amount of insect food; also the acuteness which led such birds to recognise the existence of the insignificant and deeply-buried prey. He would be interested to know whether any of the Fellows present had made similar observations.

Dr. J. G. Myers described his experience with the galls of *Cynips kollari*, Hart, and a little later prepared the following detailed statement of his observations:—

"Some full-sized galls of *Cynips kollari* were collected on 28.viii.1927 at Burnham Beeches. Most of them, judging by a sample cut open, contained recently-formed pupae, but a number contained full-fed larvae. Of 30 galls picked at random and kept in a wooden box indoors with no moisture provision, 28 produced adults at various dates during the autumn. The remaining two were opened and found to contain full-fed larvae, which are now pupating (June) and will presumably produce adults this summer.

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* These hard round bullet-like galls are usually but apparently erroneously called "oak-apples." Cameron states that *C. kollari* was not recorded as British until 1834, and has only become common in recent years. Mr. K. G. Blair who, with Dr. S. A. Neave, has kindly looked up the literature at a time when I was cut off from it, writes: "The large, irregular soft galls on the oak, flushed with pink when fresh, but ripening to brown, are those called 'oak apples' (see Connold). The insects coming from them used to be known as *Teras terminalis*, F., but their alternate generation, forming a root-gall on the oak, has the earlier name, *Biorhiza aptera*, F., so that the 'oak apple' insect is now called *Biorhiza aptera*, form *terminalis*. The hard, round, bullet galls on the oak are those of *Cynips kollari*."

The unsatisfactory character of many popular names is well exemplified by the term "oak-apple," now commonly and very naturally applied to a gall which did not exist in the country when the word was introduced.

"[illegible] a lad (say in the eighteen-seventies) these were known as Devonshire Bullet-galls

[illegible]

"Near the original spot on 7.iv.1928, an examination of the bushes showed that the majority (about three-quarters) of the galls had the small circular exit-holes of the autumn adults. A very large number of the remainder had been pecked into by birds. The beak-marks were triangular, very like those made in coconut by Tits, especially the Great Tit (*Parus major*). In every case the irregular hole pecked in the side of the gall, led to the central cavity. In no instance had the bird pecked into galls which showed the small autumn exit-hole, though these galls were in other respects externally identical. In one gall, the cavity had been reached by two pecked holes, at opposite sides—a circumstance rather difficult to explain.

"Of 12 galls without exit-holes, collected at random, 5 had been opened by birds. The remaining 7 were sound, 4 containing full-grown larvae of *Cynips kollari*, 1 containing a central brownish inquiline pupa and another with five smaller inquiline larvae, in small cells round the centre. The seventh sound gall was fused with one which had been pecked into by a bird, but was itself empty, and had presumably been neglected by the bird on that account.*

"The two interesting features are that an appreciable proportion of *Cynips kollari* larvae, full-fed at the end of the summer, do not, like their sisters, pupate and emerge as adults in the autumn, but pass the winter in the galls as larvae; and that these wintering larvae, plus the larvae of inquilines and parasites, serve as food for birds, which seem able, almost infallibly, to select only those galls containing larvae."

Dr. A. D. Imms said that he, like Dr. Myers, had found that only the galls containing insects were attacked. He remembered finding some years ago, at Teignmouth, three such galls (with no emergence holes) with deep and rather jagged wedge-shaped pieces taken out of them presumably by the beak of some kind of bird.

Mr. H. M. Edelsten said that last winter he had frequently noticed from the windows birds pecking the oak-galls of *C. kollari* which were very numerous on a small oak-tree. The Great Tit appeared to be the chief visitor, and it was wonderful to see how it was able to peck these hard galls: sometimes it would knock one off and then followed it to the ground and pecked at it there. He did not notice whether the Tits only attacked tenanted galls, but from the way they seem able to distinguish whether clearwing larvae, etc., are at home or not,† he imagined they would only attack those from which the insect had not emerged, unless of course something had taken refuge in the boring.

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* The fact that the empty gall without an emergence hole was unpecked suggested the possibility that its condition had been detected when the other one was opened. It is possible that a sense-organ of the bird was affected by some stimulus reaching it through the fused tissues of the two galls. Dr. Myers replied to this suggestion:—

"I was very interested, myself, in the point you emphasise. I was wondering whether, perhaps, the bird could tell the difference by tapping. The larva or pupa of the *Cynpis* fills the cavity very completely, whereas the empty one would sound hollow. Aren't Woodpeckers supposed to find grubs in this way?"

Dr. Myers' suggestion is supported by the frequency with which bark-encrusted cocoons are opened and the pupae abstracted (*Proc. Ent. Soc. Lond.*, 1904 (1905), pp. cxxi, cxxii). E.B.P., 20 October 1928.

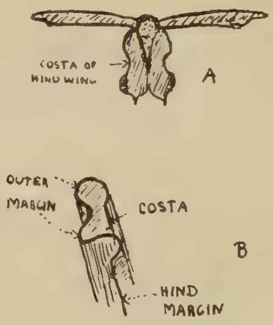
† Prof. E. G. R. Waters had kindly supplied the reference to this interesting power of discrimination: "13 *June*, 1928.—The liability of the larvae of *Aegeria flaviventris* and *formicaeformis* to be pecked out by birds has been recorded by Mr. Wm. Fassnidge, of Southampton, in the *Entomologist's Record*, XXXIX, pp. 68, 69, and in the *Transactions of the Hampshire Entomological Society*, 1927, pp. 25–29. See also *Ent. Record*, 1926, p. 79, on *Grapholitha servillana*, and p. 14, on *Aegeria andrenaeformis*."

The following further note was communicated by Mr. Edelsten on 20 June, 1928 :—

" As I was walking in the garden this evening a Nuthatch flew up from under an oak-tree. I then found the galls of both *C. kollari* and *Biorhiza aptera*, lying on the ground. While picking them up, one of the former fell by my side. I then saw a Great Tit busy pecking the soft galls of *B. aptera*, which are full of larvae. I could not say whether the Nuthatch was waiting below while the Tit knocked them off or whether he had also been pecking them and had followed one to the ground."

Prof. Poulton said that the discrimination between an empty and a tenanted gall of *C. kollari* and similarly between these two conditions of an Aegeriid larva-tunnel was extremely interesting from the bionomic point of view; for it furnished a proof that birds possessed the sense-organs, powers of association and memory which are believed to have led by selective destruction to the development of the Warning, Mimetic and Cryptic appearances of insects.

RESTING ATTITUDE OF AN EPIPLEMID MOTH FROM AMANI, TANGA, T.T., EAST AFRICA.—Prof. POULTON said that he had received from Mr. C. B. Williams the specimen and drawing described in the following note :—



A insect at rest about natural size
B. rolling of front wing.

" 12 *February*, 1928.—I enclose a small moth which has the most remarkable resting habit, which might be interesting to show at the Entomological Society. When at rest the hind-wings cover the body, giving it a curious shape owing to the sinuate costa and projecting tufts of hairs, while the fore-wings are *rolled up* and stuck outwards and at first glance the whole appears like a Plume Moth with a dilated body. I enclose a rough sketch from life. I found the moth on the diningroom wall, which is not a natural habitat, but I may say that until I had boxed it and shaken it so that it unrolled its front wings I had no idea what it was."

The moth was a species of *Epiplema* not represented in the British Museum collection. It was interesting to compare Mr. Williams' sketch, here reproduced, with the text-figure of a Geometer, *Coenina aurivena*, Butl. (BOARMIINAE), from a drawing by Dr. G. D. H. Carpenter (*Proc. Ent. Soc. Lond.*, 1925, p. lvii) and with another Boarmiine, *Phyllodonta angulosa*, Cram., observed by Mr. C. H. Lankester in Costa Rica (*ibid.*, Vol. I, 1926, p. 10). The interesting fact " that this attitude should be assumed independently by certain Geometrids, by Epiplemids and by Plumes " was referred to on the last-mentioned page.

A UGANDA BAT PREYING ON SPHINGID MOTHS.—Prof. POULTON exhibited the wings picked up by Dr. G. D. H. Carpenter, 20 October, 1927, beneath a roosting-place of bats in a resthouse at Budumba Camp, Budama District, E. Province, Uganda. With the exception of a single wing of the Noctuid *Chalciope hyppasia*, Cram. (CATOCALINAE) all the remains were those of Hawkmoths, six species being represented. It was hoped that a full list would shortly appear in a paper on the food of insectivorous bats in the *Proceedings of the Zoological Society.*

THE DISTASTEFULNESS OF AN *ACRAEA* TO A CHAMAELEON.—Prof. POULTON communicated the following record of an experiment by Dr. G. D. H. Carpenter, and exhibited the three specimens of *Acraea acerata*, Hew. (*vinidia*, Hew.), two of which had been offered. The Chamaeleon had been kindly identified as *C. bitaeniatus,* Fischer, from the locality and Dr. Carpenter's description, by Mr. H. W. Parker of the Natural History Museum.

" Any observation which contributes evidence of the distastefulness of insects which are believed to possess this quality is worth recording, so I now send the following account for the Entomological Society. For some weeks I have had in captivity a pair of small Chamaeleons taken on Ruwenzori mountain at a height of about 6500 feet. The male has a small horn on the nose and a large pointed helmet on the occiput, directed backwards. They feed readily on flies and will eat Noctuid moths and even such large insects as the smaller SPHINGIDAE. On 6 April in the afternoon when the Chamaeleons were far from replete I put into the cage a living *Acraea*, which fluttered vigorously on the wire gauze. The female Chamaeleon at once gazed at it, and watched it with great intentness for some minutes, but as she did not catch it I concluded she recognised but did not want it. However, when I looked into the cage about ten minutes later she had captured and then rejected it, and the butterfly, with crushed abdomen and wet with saliva, lay on the leaves beside her, waving its fore-wings (Specimen No. I).

" Next morning, when the Chamaeleons had had hardly any food, I gave them another *Acraea*. The female, being very hungry, struck at it, though after a longer delay than is usual with flies, but caught it only by a wing, and the butterfly was drawn up to the lips by the recoil of the tongue but not taken into the mouth. In a few seconds, after some apparent attempts to eat it, she released the butterfly, which dropped to the ground and lay as if dead with wings closed for five minutes.

The male Chamaeleon had seen it drop and now approached and watched it intently. Directly it began to flutter again he caught it and drew it into his mouth although part of the wings projected. He mouthed it a great deal and then, to my great interest, deliberately scraped it out of his mouth with his left fore foot and threw it down (Specimen II). Both Chamaeleons subsequently ate many flies during the day, showing that they were really hungry. The butterfly would, I think, under natural conditions have escaped little harmed when released by the female, as she did not bite its body. A third specimen (Specimen III) is sent for identification.

"G. D. Hale Carpenter, Entebbe, 7 April, 1928."

An Aegeriid moth (sp. n.) from Uganda mimicking an Ichneumonid. The Ichneumonid ovipositor used as a sting.—Prof. Poulton exhibited the specimen referred to in the following passage from a letter written, 24 July, 1927, at Entebbe, by his friend Dr. G. D. Hale Carpenter :—

"On 12 July I caught a beautiful clearwing moth that completely deceived me. I saw what I thought was a yellow Ichneumonid (*not* Braconid) flying about among herbage on banks of a stream, hunting for a victim in the steady, persevering, slow manner characteristic of these Hymenoptera. I caught it and took it out of the net in my fingers gingerly, expecting a 'sting.' (Don't reply that Ichneumons haven't got *stings*, as an entomological friend once tried to persuade me about *Mutilla* ! They *do* sting, although what they actually thrust into you may be an ovipositor !) Later on I saw a second and again wondered at the Hymenopteroid appearance, but couldn't catch this second one."

The following note accompanied the specimen : "Amar, nr. Gulu, 12.vii.1927. I saw this flying slowly and heavily among herbage and caught it as an Ichneumonid, taking it from the net very gingerly in fingers for fear of being stung ! Later saw another and was again impressed by the mimicry."

The delay in communicating this interesting note is due to the fact that the specimen had been left with the late Mr. J. H. Durrant, who was on the point of describing it at the time of his death. Mr. Edward Meyrick, F.R.S., has now kindly described it below.*

Mr. E. E. Green, referring to Dr. Carpenter's remark about the sting of an Ichneumonid, said that he had been stung by one of these insects, which laid an egg in his finger. It happened before he went out to Ceylon—nearly fifty years ago, and was a protest against being picked up and roughly handled. The insect was certainly an Ichneumonid—a largish species resembling *Ophion*, and the egg was deposited just beneath the skin. He remembered that it was a reddish, sausage-shaped object, which perhaps may not have been an egg, although he believed it to be one at the time.

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* **Aegeria ferox,** sp. n.

♀. 19 mm. Head blue-black, collar orange-red. Tongue apparently very short. Palpi orange. Antennae blackish, thickened portion apparently pale ochreous (rubbed). Thorax blue-black, sides of metathorax orange-red. Abdomen orange-red, segms. 1 and 2 with deep indigo-blue dorsal spots, 3 with dorsal band, 4 with strong band all round, 5 and 6 with dorsal bands obsolescent ventrally, anal segment blue-black above. Legs orange, middle and posterior tarsi mostly blue-black above. Fore-wings hyaline tinged grey; broad costal and slender dorsal blue-black streaks, base of dorsum orange-red; veins black; a strong blue-black bar on transverse vein, rather broader upwards; a moderate blackish-fuscous terminal fascia, narrowed to tornus: cilia dark bronzy-grey, a blackish basal line. Hind-wings hyaline tinged grey; veins, a triangular spot on upper part of transverse vein, and a terminal line becoming a slender streak round apex blackish; hairs on base of dorsum reddish-orange; cilia dark bronzy-grey, a blackish basal line, on base of dorsum reddish-orange.

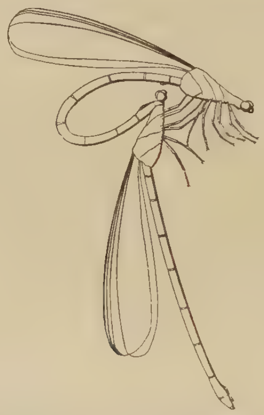
Uganda, Amar, near Gulu, July (*Carpenter*); 1 ex.
Type in Hope Dept., Oxford Univ. Museum.—Edward Meyrick.

In a letter of 8 June, 1928, confirming the details of his communication, Mr. E. E. Green described an observation at Camberley, showing the remarkable power of penetration possessed by the hair-like ovipositor of *Sirex* :—

"This afternoon I have been watching, at close quarters, the operation of oviposition by *Sirex gigas* in a larch log. The slender ovipositor was completely disengaged before insertion, the stout sheath was extended horizontally and not employed as a guide or support. The comparative ease with which this extremely slender organ was driven into the woody tissue, to a depth of at least an inch, seems almost incredible. I (and Mr. K. G. Blair, who was with me) timed two separate operations, occupying 10 and 12 minutes respectively, from commencement of insertion to completion of withdrawal."

NOTES ON THE EPIGAMIC BEHAVIOUR AND PAIRING OF *PYRRHOSOMA NYMPHULA*, SULZ. (ODONATA), BY PROF. E. B. POULTON, M.A., D.Sc., F.R.S., AND DR. H. ELTRINGHAM, M.A., D.Sc.

Prof. Poulton, in the absence of Dr. Eltringham, communicated the following notes and exhibited the third pair of specimens referred to in them. He said that Dr. G. D. H. Carpenter's notes on the Uganda Dragonfly *Libellago caligata*, Selys, exhibited at the last meeting (*Proc. Ent. Soc. Lond.*, III, 1928, p. 38) had made them extremely anxious for observations which would throw light on his interesting hypothesis that the carmine posterior surfaces of the male tibial plates act as a stimulus to the female in the "tandem position." Most fortunately the opportunity was afforded on 3 June, 1928, the day following Mr. Adkin's meeting of the Entomological Club at Hodeslea, Eastbourne. On that morning, four members of the Club, Mr. Adkin, Mr. H. Willoughby Ellis, and ourselves, visited Whitefields Wood, where these Dragonflies abounded, accompanied by a small species resembling *Agrion puella*, L., along the sides of the paths where there was shelter from the cold wind and exposure to the brilliant sunshine. Nothing significant was seen except in the interval between 12.30 (summer time) and 12.50, when our visit came to an end. In this short period of time three pairs were observed in the lane leading from the main road to the wood. In all three the female was held in the "tandem position," her weight being borne by the male clinging to a leaf on the hedge. The male of the first pair was seen to settle about six feet from the ground. He then several times flexed his abdomen and thus raised the end of the female's body towards the copulatory apparatus. The female co-operated by flexing her body. Two or three times there was momentary contact, but the behaviour of the two other pairs indicated that no effective pairing had taken place. The number of abortive attempts, separated by intervals of rest, suggested that pairing was either just beginning or nearly at an end. During some of these attempts the male was seen to vibrate his open wings rapidly. How far the wings were open or closed at other times was not observed, but it is believed that they were closed, as also in the second and third pairs. The first attempt differed from all the others, in that the male flexed his abdomen so far as to bring the female's head into apparent contact with his copulatory apparatus, her body being curved over his own head. The accompanying text-figure, prepared from a sketch kindly made for us by Dr. R. J. Tillyard, represents the positions in which he has seen the male and female of *Xanthocnemis zelandica*, Selys. The male is here standing horizontally, and the straight dependent body of the female is nearly in the position of least strain. The male of *nymphula* observed by us was, however, hanging vertically, and a disposition of the female's body like that of the text-figure would create a maximum strain which was relieved by the strong curve of her abdomen over his head. The necessity for this becomes clear when the text-figure is turned through a right-angle so that the male's head becomes uppermost. Contact was only maintained for a second or two, and immediately afterwards the female was seen by one of us to sweep her face with some part of an appendage, probably the front tarsi, as if to remove an adherent substance. At the time we supposed that the male was applying a stimulus to the female, but, on informing Dr. R. J. Tillyard of our experience we have no doubt that he has suggested the true interpretation of the action, and that the male was charging, or attempting to charge, the secondary copulatory apparatus from the true opening of the genital duct. The head of the female, thus brought close to the secondary opening, would be likely to be smeared by touching the spermatophore, or the traces of one adhering to the apparatus. After watching this pair for about a minute they flew away in the "tandem position."



Diagrammatic representation of the male of *Xanthocnemis zelandica*, Selys, attempting to re-charge itself, while still holding the female. From a drawing by Dr. R. J. Tillyard, F.R.S.

The second pair, flying in the "tandem position," were seen to settle in the same manner as the first pair and at about the same height, and then instantly to copulate. After remaining paired for 90 seconds, coitus came to an end and they flew off, still in the "tandem position." Copulatory movements, if they occurred at all, were not nearly so pronounced as in the following.

The third pair, when first seen, were already settled about four feet up, and *in coitû*. Numerous rhythmical contractions, causing alternate curvature to the ventral side and straightening of the anterior segments of the male's abdomen, were watched for 60 seconds. The pair then flew off in the "tandem position," but were captured. The times of the second and third pairs were taken with a stopwatch, that of the first being estimated.

Our observations appeared to offer strong support to Dr. Carpenter's hypothesis. The movements made by the first male, obviously in the attempt to induce coitus, were such as would have made the carmine posterior surfaces of the tibial plates prominent objects in the field of the female's vision.

Additional Note by Dr. R. J. Tillyard, F.R.S.

My attention having been drawn by Prof. Poulton to the above observed phenomena, I should like to add that I have frequently seen similar behaviour on the part of Australian and New Zealand damselflies, and call to mind, in particular, the case of the common red damselfly in New Zealand, *Xanthocnemis zelandica*, Selys. As is well known, the penis of the male dragonfly is a highly specialised organ developed from the sternites of the second and third abdominal segments, but the original genital opening or gonopore still persists functionally on the ninth sternite. The condition of the spermatozoa on extrusion from the gonopore is not known for most Odonata, but I have proved, in the case of the genus *Aeschna*, that they are passed out in the form of a sticky mass or spermatophore. In any case, the male dragonfly has to charge himself with sperm before copulation, and this he usually does when indulging in a solitary flight before capturing a female and adopting the "tandem position" with her. But it frequently happens, especially with the damselflies, that the "tandem position" is retained for a very long time, and that the male accompanies the female during oviposition and often even descends far down into the water with her. In such a case, the male will often make efforts to re-charge himself with sperm while still retaining his hold of the female with his anal claspers. The larger dragonflies (Anisoptera) hold their females by the occiput, but the damselflies (Zygoptera) hold them by a double grasp on the pronotal ridge. Consequently, when the male, still holding the female, brings his abdomen forward for re-charging, the effort to bring segments two and nine together results in the head of the female being brushed more or less violently against the penis of the male. Successful re-charging can be accomplished, but is not easy. The cleaning operations by the female after these movements are certainly due to her having received on her head a portion of the sticky mass of spermatozoa. In the case of species whose males have the underside of the tibiae highly coloured, it is clear that the eyes of the female will come close enough to them to make them prominent objects in her field of vision.

Papers.

The following papers were read :—

1. "The Pollination of an Australian Orchid by the male of the Ichneumonid *Lissopimpla semipunctata*, Kirby," by Mrs. Edith Coleman; with an Appendix describing confirmatory observations, by Arthur M. Lea, F.E.S., Government Entomologist, S. Australia.

Prof. Poulton gave a brief account of the paper and exhibited the drawings for the two plates and the specimens sent by the authors. He also exhibited the male and female forms of the Pterothysanid moth, *Hibrildes norax*, Druce, described and figured in his appendix to Dr. R. A. Fisher's and Mr. E. B. Ford's paper on "The Variability of Species in the Lepidoptera, etc.," read 21 March, 1928.

2. "Observations on the bionomics of the Lepidoptera of Matto Grosso, Brazil," by Mr. C. L. Collenette and Mr. G. Talbot.

3. "The Rhopalocera of the Marquesas Islands, the Society Islands, the Tuamotu Archipelago, Rapa, and the Austral Islands," by Miss L. E. Cheesman, Prof. E. B. Poulton, F.R.S., and Captain N. D. Riley.

4. "Horae Formosae. The Syntomidae of Formosa," by Mr. A. E. Wileman.

5. "New Hymenoptera from British Columbia," by Mr. O. Whittaker, F.R.M.S.

Wednesday, October 3rd, 1928.

Mr. J. E. Collin, President, in the Chair.

Obituary.

The President announced the deaths of Professor C. Aurivillius, an Honorary Fellow, and of The Hon. Mrs. Beatrice Carpenter, Mr. C. L. Fox, and Mr. F. C. Woodforde, Fellows of the Society.

Election of Fellow.

The following was elected a Fellow of the Society :—The Rev. C. E. Tottenham, 60, Mt. Ararat Road, Richmond.

Exhibits.

The effect of Carnivorous habits in Insects.—Dr. S. A. Neave communicated the following note from Mr. E. Ballard, Chief of the Entomological Section, Ministry of Agriculture, Cairo :—

"In connection with Dr. Perkins' remarks on cannibal habits in *Nemoria viridata* (*Proc. Ent. Soc.*, iii, p. 20) my experience of *Dysdercus* might be of interest to the Fellows. I have described these habits in this bug in a recent paper (*Bull. Ent. Res.*, xviii, p. 414). I had many broods that were afflicted in this way, and in every case the survivors were abnormal and the whole brood appeared sickly. It seemed, in fact, to be a pathological condition, and the meat diet did not agree with them.

The caterpillars of *Heliothis obsoleta* and *Euxoa radians*, on the other hand, both thrive on a cannibalistic diet, but so far as I know they only eat one another, whereas *Dysdercus* will often suck other insects."

Rare Coleoptera from Windsor Forest.—Mr. Donisthorpe exhibited specimens of the rare Staphylinid, *Atheta nidicola*, Johan., which he had discovered in hawks' nests in Windsor Forest, together with other species of Coleoptera found with it.

He at first took the *Atheta* rather sparingly in 1927, but in greater numbers this year under exactly similar circumstances. The hawks' nests occurred in the top-most branches of tall Scots pines, and the beetles were taken by sieving the nests, which consist of very coarse sticks, twigs and moss, over a sheet.

Johansen, who described this species in 1914, records it from the nests of large birds in trees. Deville had it sent to him from a squirrel's nest from Denmark, and from " un nid de falconides " near Nancy. At Windsor, when the birds have flown, the Grey Squirrel soon takes possession of the empty nests.

Of the other species taken, *Gnathoncus buyssoni*, Auz., is also new to Britain. It has been taken on the Continent in the nests of hawks, owls, and the " Wryneck." It was first described in 1917. Six other species of *Atheta* were present, of these *A. nigricornis*, Th., was the most abundant. *Quedius brevicornis*, Th., and *Philonthus fuscus*, Gr., are regular inhabitants of birds' nests. *Dromius angustus*, Brullé, is a rare species which was first taken in Britain by Champion at Woking —it is connected with fir-trees.

To make the biocoenose of these nests complete, to use Prof. Wheeler's expression, one should also exhibit the Psoccids, spiders, fleas, etc., etc., which are to be found in abundance in them.

The following is a list of all the species exhibited :—*Atheta nidicola*, Johansen, and *Gnathoncus buyssoni*, Auz., new to Britain. *Dromius angustus*, Brullé, *Atheta reperta*, Shp., *A. boletobia*, Th., *A. cinnamoptera*, Th., *A. nigricornis*, Th., *A. laevana*, Mul., *A. laticollis*, Steph., *Quedius brevicornis*, Th., *Philonthus fuscus*, Gr., *P. proximus*, Kr., *Oxytelus tetracarinatus*, Block., *Homalium concinnum*, March., *Choleva fumata*, Spence, *Omosita discoidea*, F., and *Atomaria apicalis*, Er.

CHRYSOPHANUS DISPAR RUTILUS AND *C. DISPAR BATAVUS*.—Mr. H. M. EDELSTEN exhibited a series of the former from Capt. Purefoy's colony in Ireland, and a series of the latter from the colony established by the Society's Protection Committee in Wood Walton Fen. He said that the fine summer had been favourable to the colony of *dispar batavus*, and that there is a big stock of larvae in the Fen in addition to a large number being hibernated in confinement.

It was also of interest to note that the Norfolk colony of *C. dispar rutilus* formed in 1927 is still holding its own.

WASPS ATTACKING RUNNER BEANS.—Mr. EDELSTEN also exhibited pods of runner beans which had holes bitten in them by wasps.

BUTTERFLIES FROM STYRIA.—Mr. L. G. HIGGINS said : " My wife and I collected this year in Styria on the most eastern ranges of the Alps. The locality is very interesting as several remarkable local forms of common Alpine butterflies are confined to this restricted area. In some cases these are typical of the species in question, in other cases they are well-recognised varieties or subspecies. It is remarkable that no British collectors seem to have explored these mountains, and consequently the forms that occur there are almost absent from our collections, and are scarcely represented at the British Museum. Indeed, it is hardly too much to say that few Englishmen have ever seen these races which were those described by the earliest authors.

" To-day I have brought up only the species of *Erebia*, of which we found eight in Styria and three additional ones in Carinthia. It is rather remarkable that neither *E. tyndarus lappona* nor *E. epiphron* was seen in Styria. I wish to direct your attention particularly to the series of *E. manto* and *E. pronoe,* both of which differ considerably from the forms found in the Central Alps, and which in both cases represent the typical race. In common with the majority of Styrian species of *Erebia,* their red markings are extensive and very bright. *E. oeme spodia* is a very striking form which certainly does not occur far outside this district, while *E. medusa hippomedusa* was also named from Styrian specimens, and it is doubtful whether the form occurs elsewhere except possibly as a rare aberration."

THE FERTILISATION OF ORCHIDS OF THE GENUS *SERAPIAS* PROBABLY EFFECTED BY BEES SEEKING THE FLOWERS AS A NOCTURNAL SHELTER.—Col. M. J. GODFERY said : " The flowers of the genus *Serapias* differ remarkably from all other European Orchids in shape and colour. The sepals and petals join to form a pointed helmet, from which hangs down the mid-lobe of the lip—broad, heart-shaped and dark red-brown in *S. cordigera,* L., long, tapering and brick-red in *S. longipetala,* Poll. The side-lobes of the lip are very dark blackish-red and are curled up to form a tube concealed within the helmet, only their front edges showing in the above two species, to which this paper is confined. This inner tube answers the same purpose as the dark-coloured paper lining in French envelopes—it renders anything within quite invisible from outside. The flowers have no nectar and are dull and rather livid in colour, but in the almost level rays of the setting sun they light up in a wonderful manner, and become a brilliant red by transmitted light.

" Early on the 15th April, 1920, my wife called my attention to a small bee on some spikes of *Serapias cordigera* gathered the evening before. It had a pair of pollinia on its head, which proved on comparison to be those of *S. cordigera.* A week later we examined numerous flowers of this species *in situ,* and she detected the abdomen of an insect just visible in the throat of a flower. Its occupant turned out to be of the same kind as before, and bore two pairs of pollinia. It was identified by Mr. Willoughby Gardner as *Osmia leaiana,* W. Kirby, ♂. On the 15th April, 1925, at Valescure, the late Colonel Meister brought me *S. cordigera* with *Anthidium affine,* Mor., ♀, in one flower, bearing a pair of its pollinia on its head. At 10.30 a.m. next day it had not quitted the flower. In 1924 I received a dried specimen of *S. cordigera* from Alger, and noticed an unfortunate bee which had evidently perished in its last sleep, and was pressed flat in one of the flowers. It was identified at the Paris Museum as *Osmia notata,* F., ♀. On the 18th April, 1928, Colonel G. H. Evans sent me a specimen of *Anthidium septemdentatum,* Latr., taken by him on *S. cordigera* at Valescure.

" At Vence, above Nice, on May 22nd, 1920, I gathered some spikes of *S. longipetala* in the late afternoon, and noticed the end of a bee in one flower, which I placed in a glass-lidded box. I looked at it frequently, but the bee did not stir, and it had not moved even after I had dressed and breakfasted next day. My wife then pointed out a small bee buzzing against a gauze curtain over the open window. I thought my bee must have escaped somehow, and captured it. It was *Osmia leaiana,* ♂, but bore no pollinia. I then gently opened the flower containing my original bee. Slowly and reluctantly he began to move, and stretched first one leg and then the others, like a man stretching himself when he awakes from sleep.

Then he suddenly appeared to realise that he was a prisoner, and immediately sprang from his drowsy laziness into a state of extreme activity, searching furiously for a way of escape. He also proved to be *Osmia leaiana*, and had a pair of pollinia of *S. longipetala* on his head. Presently a third specimen of the same species appeared on the curtain, all evidently from the spikes gathered the previous evening. I later took a specimen of *Anthidium cingulatum*, Latr., ♀, in a flower of *S. longipetala* at Vence, and on the 2nd May, 1925, at Tremezzo, Lago di Como, a specimen of *Osmia aurulenta*, Pnz., ♂, on the same species.

"It therefore seems that *Osmia leaiana*, *O. notata*, *Anthidium affine* and *A. septemdentatum* find a convenient night's lodging in the flowers of *Serapias cordigera*, and *Osmia leaiana*, *O. aurulenta*, and *Anthidium cingulatum* in those of *S. longipetala*. The flowers of both species are specially adapted for the concealment of any insect from birds or other enemies, and also afford protection from rain.

"To enable it to render this service to the insects necessary for cross-pollination, the flower has been modified in architecture, shape, and coloration, in a way unknown in any other genus of European Orchids. Its curious faculty of lighting up like a Chinese lantern in the rays of the setting sun, just when desirable visitors are on the look-out for a suitable resting-place for the night, is probably more than a happy coincidence. Moggridge records (*Contributions to the Flora of Mentone*, 2nd Ed., Lond., 1867, Pl. XVI, fig. 4) that *Ceratina albilabris*, F., was taken by him within the helmet of *Serapias cordigera*, bearing on its head the pollinia of *S. lingua*, L., grains of which were found adhering to the stigma of *S. cordigera*.

"The lip of *Serapias cordigera* and of *S. longipetala* is covered rather thickly with long erect but somewhat soft and yielding hairs, a feature too marked to be unconnected in some way with the welfare of the plant. It is suggested that these hairs, well shown by Moggridge (*Journ. Linn. Soc.*, 1865, Pl. XVI, fig. 2) and Reichenbach fil. (*Icones*, Pl. LXXXVIII, figs. 5, 19 and 20), who describes them as '*papillis filiformibus vesiciferis*,' conduce to the warmth and comfort of the inmate ensconced among them, perhaps taking the weight of the body off the legs. Somewhat similar hairs are found on the floor of the lip in *Cypripedium calceolus*, in which several species of *Andrena* have been observed to spend the night, sometimes being found numbed with cold in the early morning. Some of these hairs secrete a tiny drop of fluid at the tip, and Müller states that the *Andrenae* lick and bite them (*Fert. of Flowers*, Engl. transl., 1883, p. 539). If so, not only accommodation and concealment, but a certain measure of refreshment is also provided."

BAORIS ZELLERI, LED., AN UNRECOGNISED EUROPEAN HESPERID.—Capt. A. F. HEMMING exhibited specimens of *B. zelleri* from Spain and other localities and of *B. borbonica*, Boisd., from Mauritius, and communicated the following note :—

"In 1910, Oberthur announced the capture in Algeria of the Tropical African Hesperid, *Baoris borbonica*, Boisd. (*Faun. Ent. Mad.*, p. 65, pl. 9, figs. 5, 6, 1833), at the same time giving the name *holli* to the newly discovered race. The capture of *holli* in the South of Spain was recorded by Krüger in 1913. In October 1920, my father and mother made a small collection of butterflies for me at Algeciras, mostly in the gardens of the Hotel Reina Christina. Among the insects which they took were six examples of *holli*, Oberthur. These corresponded exactly with the figures published by Oberthur (1911) of his types of *holli*. They were also indistinguishable from Egyptian specimens of *B. zelleri* kindly given me by Major Graves. The types of Boisduval's *B. borbonica* came from ' Bourbon et Maurice.' I have not seen any examples from the former locality; but fortunately an example from the neighbouring island Mauritius was available. The genitalia of the Mauritius *borbonica* prove to be quite different from those of *holli*. The genitalia of the latter are, however, indistinguishable from those of *zelleri*. In other words, *holli*, Obth., is merely a synonym of *zelleri*, Lederer. In the result, *B. borbonica* must now be deleted from the Palaearctic list and *B. zelleri* must be added to the European list.

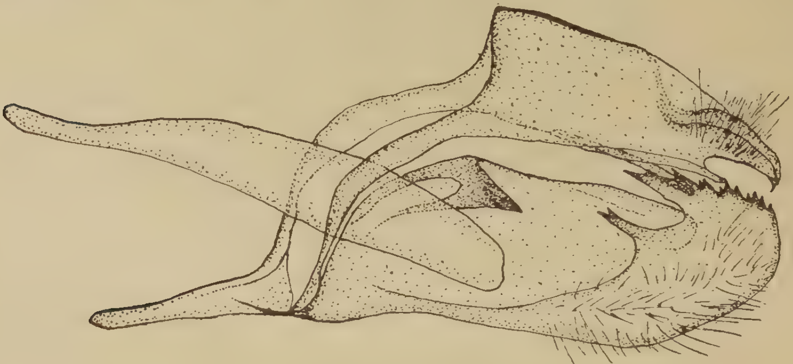


FIG. 1.—*Baoris borbonica*, Boisd. Mauritius.

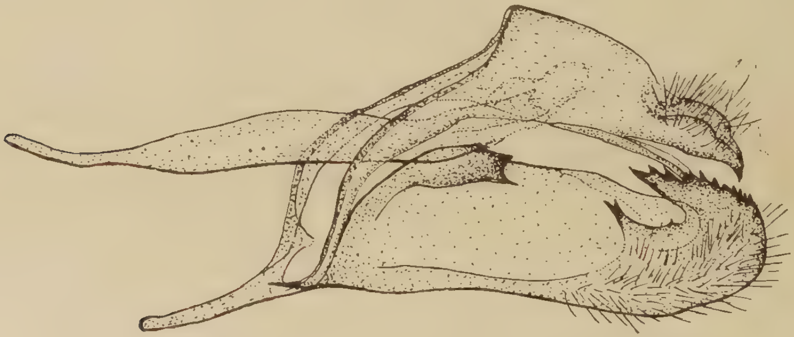


FIG. 2.—*Baoris zelleri*, Led. Spain, Algeciras. 26.10.1920.

" The differences in the genitalia of the two species may be summarised as follows :—*Baoris borbonica*, Boisd. (Text-fig. 1). The whole genitalia larger than those of *zelleri* ; the tegumen relatively longer and the uncus straighter and less massive. The clasp similar to that of *zelleri*, except that (*a*) the cuiller is larger in proportion to the remainder of the clasp and (*b*) the harpe is roughly sub-triangular in shape. *Baoris zelleri*, Led. (Text-fig. 2). The whole genitalia smaller than those of *borbonica* ; tegumen relatively shorter and the uncus heavier and more curved ; the clasp differs from that of *borbonica* in that (*a*) the cuiller is smaller in relation to the remainder of the clasp and (*b*) the harpe is roughly ovoid in shape and has a bidentate apex.

"The chief references to the western Palaearctic distribution of *B. zelleri* are as follows :—

Baoris zelleri, Lederer.

Lederer	1855.	Verh. z-b. Ver. Wien, **v**, p. 194 (*Hesperia sp.*).
Walker	1890.	Trans. Ent. Soc. Lond., **1890**, p. 378.
Meade-Waldo	1905.	Trans. Ent. Soc. Lond., **1905**, p. 380.
Fountaine	1906.	Entom., **xxxix**, p. 109.
Mabille	1909.	Seitz, Macrolep. World, **i**, p. 350, pl. 89, fig. F. 5.
Graves	1915.	Ent. Rec., **xxvii**, pp. 268–9.
Rebel	1916.	Ann. Naturh. Hofmus, **xxx**, p. 117.
Graves	1919.	Ent. Rec., **xxxi**, p. 5.
Oberthur	1922.	Ét. Lep. Comp., **xix** (1), p. 115.

Syn. : *holli*, Oberthur.

Oberthur	1910.	Ét. Lep. Comp. **iv**, pp. 363–5 (*Pamphila borbonica*, var.).
id.	1911.	*Ibid.*, **v**, p. 317, pl. 60, figs. 552 ♂, 553 ♀.
Krüger	1913.	Soc. Ent., **xxviii**, pp. 21–2.
Gibbs	1913.	Ent. Rec., **xxv**, pp. 116–17.
Oberthur	1915.	Ét. Lep. Comp., **x**, p. 406.

"From the list given below, it will be seen that *zelleri* occurs from Syria to Egypt and thence along the Mediterranean littoral to Morocco, only reaching Europe in the extreme south of Spain. It appears usually to be rather scarce, but this may, in part, be due to the fact that the main, and in some localities probably the only, emergence takes place in the late summer and autumn, a season when few entomological collections are made. Such observations as are available point to *zelleri* preferring damp situations. In Egypt, rice is one of the food-plants of the larva.

"SPAIN. Algeciras, near the railway station, June–July, 1899, Sierra de la Luna, mountains above Algeciras, Aug.–Sept. 1899 and subsequent years (*Krüger*); Algeciras, 24–26.10.1920, six males (*Hemming*).

"MOROCCO. 'Local and scarce, frequents wet places in woods, Bashasin May 20, Tangier August 30, 1901' (*Meade-Waldo*). 'My first specimen was taken at Benzús Bay on August 30th, 1887, and I subsequently met with it in a damp spot among the sand-hills about a mile east of Tangier on September 19th and again in some numbers on the edge of the Esmir Lagoon on October 1st. In the following year I took it again at Esmir on July 25th, and in good condition as late as November 10th' (*Walker*). Of the specimens recorded above, the British Museum possess the following : 'Buzaghal, Oct. 1887,' ♂ 1, ♀ 1, and 'Tangier' and 'Esmir near Tangier,' ♂ 3, ♀ 2, labelled 25.7.1888 and 7.1888. Oberthur records the capture of *zelleri* by Vaucher at Laroche and Rabat.

"ALGERIA. 'Very rare at Sebdou in August [1904]. I only took one specimen and saw about three others' (*Fountaine*); Department d'Alger, Hussein-Dey, 20.10.1910, taken by Monsieur Eugène Holl (*Oberthur*).

"EGYPT. Meadi, a suburb of Cairo, on the Helouan Railway, Sept. 1915, mostly in bad order (*Graves*, 1915); 'found in numbers in most of the public gardens near Cairo in Sept. 1916 and in some numbers in the larval stage on rice at Teh-el-Barod, Behera Province, early in the same month' (*Graves*, 1919); Alexandria, Ghabrial near Ramleh, early June 1904; Suez, one specimen taken in May in the collection of the Ministry of Agriculture, Cairo; in the same collection, normal specimens and others heavily suffused on the upperside of the fore-wings, taken in the Maryut Steppe at the end of May and in June; reported by the late E. W. Adair as seen by him in the same district in September; Baharia Oasis, taken in Sept.–Oct. 1916 by a military officer who gave one specimen to Graves (*Graves, in litt.*).

"PALESTINE. This species was discovered in Palestine by Capt. L. K. Lockhart, M.B.E., M.C., R.A., who took a fine ♂ (now in the Hemming coll.) at Tabgha (or Tabagha) on the N.W. shore of the Sea of Galilee on Oct. 21, 1927.

"SYRIA. Beirut, where the type specimens were caught by Franz Zach (*Lederer*); Beirut, at mouth of the Dog River Valley, July 1907, 1 ♂ (*Graves, in litt.*). There are a number of Beirut and other Syrian examples in the British Museum. They are inseperable from those from Spain and Northern Africa.

"CRETE. 1 ♂ in the Museum at Vienna, labelled 'Candia, 1857, ? Frauenfeld' (*Rebel*).

"CYPRUS. Rebel gives Cyprus as a locality for *zelleri*. Its occurrence there is very probable, but it has not, so far as I am aware, been confirmed by any recent collector."

THE MIGRATORY PYRALE, *NOMOPHILA NOCTUELLA*, SCHIFF, OBSERVED RESTING ON THE CALM SURFACE OF THE ATLANTIC AND FLYING UP ON THE APPROACH OF A SHIP.—Prof. POULTON exhibited two specimens of *Nomophila noctuella*, taken in the circumstances described by Prof. F. Balfour-Browne in the following extract from a letter of 23 September, 1928 :—

"We left Avonmouth on the S.S. 'Camito' on July 20th, and I observed the moths on Sunday July 22nd during both morning and afternoon on the surface of the sea, which was dead calm. They rose easily off the water when disturbed by the approach of the ship. I think I am right in saying that by noon that day we were 415 miles on our course. I don't think we saw any specimens after that afternoon, and certainly I found none on the ship except the two you have got. I caught the complete specimen in my bathroom, and the other was killed by the Chief Engineer, having flown in at the porthole of his cabin."

Exhibited with these moths were examples of the three species of Pyralid and the Plume, *Alucita niveodactyla*, Pag., observed, 29 November, 1908, resting on the sea and flying up, even from the broken water at the ship's bow, by Mr. F. Muir and Mr. J. C. Kershaw (*Proc. Ent. Soc. Lond.*, 1909, pp. xxxviii–xl). This observation, made about 190 miles S.S.E. of Lower Cochin China and 120 N.N.W. of Great Natunas, provided an obvious explanation of the wide distribution of the species, an explanation now confirmed and shown to apply to a very different latitude by Prof. Balfour-Browne. It was of special interest that *N. noctuella* had been unusually abundant in England during the past late summer, as Prof. Poulton had noticed in the Isle of Wight.

It was possible that larger Lepidoptera made use of the same aid to migration. Thus 2 males, 2 *inaria*, Cram., females, and 1 *misippus* female of *Hypolimnas*

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1929.

Wednesday,	January (Annual Meeting)	16
,,	February	6
,,	March	6
,,	,,	20
,,	April	3
,,	May	1
,,	June	5
,,	October	2
,,	,,	16
,,	November	6
,,	,,	20
,,	December	4

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